SPYWOLF

Security Audit Report

Completed on

November 22, 2023

OVERVIEW

This audit has been prepared for **SAM Protocol** to review the main aspects of the project to help investors make make an informative decision during their research process.

You will find a a summarized review of the following key points:

- ✔ Contract's source code
- ✔ Owners' wallets
- ✔ Tokenomics
- ✔ Team transparency and goals
- ✔ Website's age, code, security and UX
- ✔ Whitepaper and roadmap
- ✔ Social media & online presence

The results of this audit are purely based on the team's evaluation and does not guarantee nor reflect the projects outcome and goal

- SPYWOLF Team -

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SAM Protocol

PROJECT DESCRIPTION

According to their whitepaper:

The SAM token has been designed with the aim of establishing a decentralized and innovative economic system within the SAM protocol. It serves as a central element within the network, providing unique opportunities for participation in bonding and liquidity provision.

Release Date: Launching November, 2023

Category: Liquidity Staking / Yield

CONTRACT 1 INFO (Main Contract)

Token Name
N/A

Symbol
N/A

Contract Address
0xe8F9bf821ac92Ca995D1C8E04cccf8E053396E9a

Network
Pulsechain **TESTNET**

Language
Solidity

Deployment Date
Nov 21, 2023

Contract Type
Staking

Total Supply
N/A

Status
Not launched

TAXES

Buy Tax
15%

Sell Tax
none

Our Contract Review Process

The contract review process pays special attention to the following:

- Testing the smart contracts against both common and uncommon vulnerabilities
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- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
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Blockchain security tools used:

- OpenZeppelin
- Mythril
- Solidity Compiler
- Hardhat

TOKEN TRANSFERS STATS

Transfer Count	N/A
Uniq Senders	N/A
Uniq Receivers	N/A
Total Amount	N/A
Median Transfer Amount	N/A
Average Transfer Amount	N/A
First transfer date	N/A
Last transfer date	N/A
Days token transferred	N/A

SMART CONTRACT STATS

Calls Count	N/A
External calls	N/A
Internal calls	N/A
Transactions count	N/A
Uniq Callers	N/A
Days contract called	N/A
Last transaction time	N/A
Created	N/A
Create TX	N/A
Creator	N/A

VULNERABILITY CHECK

Design Logic	Passed
Compiler warnings.	Passed
Private user data leaks	Passed
Timestamp dependence	Passed
Integer overflow and underflow	Passed
Race conditions and reentrancy. Cross-function race conditions	Passed
Possible delays in data delivery	Passed
Oracle calls	Passed
Front running	Passed
DoS with Revert	Passed
DoS with block gas limit	Passed
Methods execution permissions	Passed
Economy model	Passed
Impact of the exchange rate on the logic	Passed
Malicious Event log	Passed
Scoping and declarations	Passed
Uninitialized storage pointers	Passed
Arithmetic accuracy	Passed
Cross-function race conditions	Passed
Safe Zeppelin module	Passed
Fallback function security	Passed

THREAT LEVELS

When performing smart contract audits, our specialists look for known vulnerabilities as well as logical and access control issues within the code. The exploitation of these issues by malicious actors may cause serious financial damage to projects that failed to get an audit in time. We categorize these vulnerabilities by the following levels:

High Risk

Issues on this level are critical to the smart contract's performance/functionality and should be fixed before moving to a live environment.

Medium Risk

Issues on this level are critical to the smart contract's performance/functionality and should be fixed before moving to a live environment.

Low Risk

Issues on this level are minor details and warning that can remain unfixed.

Informational

Information level is to offer suggestions for improvement of efficacy or security for features with a risk free factor.

FOUND THREATS

⚠ Medium Risk

Owner can issue new bonds for free.
New bonds can be issued only when the contract's token balances are equal or higher than the new bond's issue token amount.

```
function influencerBond(address userAddr, uint256 tokensAmount) external onlyOwner {
    require(users[userAddr].bondsNumber < Constants.BONDS_LIMIT, "User have reached bonds limit");
    require(IPulseXERC20(TOKEN_ADDRESS).balanceOf(address(this)) >= tokensAmount, "Insufficient token balance");

    users[userAddr].balance+= tokensAmount * 5 / 100;
    uint256 ethAmount = getETHAmount(tokensAmount * 95 / 100);
    uint8 bondIdx = newBond(userAddr, 4, ethAmount, 0);

    SAMToken(TOKEN_ADDRESS).burn(tokensAmount);

    emit Events.NewBond(
      userAddr, 4, bondIdx, ethAmount, tokensAmount * 95 / 100, false, block.timestamp
    );
}
```

- Recommendation:
  - No one should be able to issue new bonds for free.

FOUND THREATS

⚠ Medium Risk

Reentrancy risk in buy() and stake() functions.
If treasury address is set to inappropriate contract by the owner, it can reenter the function and drain user's deposit on buy.

```
function buy(address upline, uint8 bondType) external payable {
.....................................
    uint256 refReward = distributeRefPayout(user, msg.value, isNewUser);
    uint256 adminFee = msg.value / 10;
    (bool success, ) = payable(DEFAULT_TREASURY).call{value: adminFee}("");
    require(success, "Failed to send PLS");

    newBond(msg.sender, bondType, msg.value, msg.value - adminFee - refReward);
}
```

```
function stake(uint8 bondIdx) external payable {
.....................................
    uint256 refReward = distributeRefPayout(user, msg.value, false);
    uint256 adminFee = msg.value / 10;
    (bool success, ) = payable(DEFAULT_TREASURY).call{value: adminFee}("");
    require(success, "Failed to send PLS");
.....................................
}
```

- Recommendation:
  - Ensure that gas parameter is added to .call with the required gas for native chain token transfer (PLS) or use .transfer() function to transfer native tokens.
    Reference:
    https://docs.soliditylang.org/en/latest/security-considerations.html#sending-and-receiving-ether

Informational

Owner can activate/deactivate bond types (1, 2 and 3), which are for 20 days, 10 days and 5 days periods respectively.
Bonds 0 and 4 (30 days and 100 days) cannot be influenced by owner
Every bond type have different ROI and freeze periods.

```
function activateBondType(uint8 bondType) external onlyOwner {
require(bondType > 0 && bondType < 4, "Invalid bond type");

    BOND_ACTIVATIONS[bondType] = true;
}

function deactivateBondType(uint8 bondType) external onlyOwner {
require(bondType > 0 && bondType < 4, "Invalid bond type");

BOND_ACTIVATIONS[bondType] = false;
}

int256[5] public BOND_FREEZE_PERIODS = [
    30 days,
    20 days,
    10 days,
    5 days,
    100 days
];
uint256[5] public BOND_FREEZE_PERCENTS = [
    3000,
    2000,
    1000,
    500,
    0
];
bool[5] public BOND_ACTIVATIONS = [
    true,
    false,
    false,
    false,
    false
];
```

Informational

There is 10% fee for bonds buy/staking that goes to the project's owner.
There is additional tax of 5% which goes towards referrals rewards.

```
function buy(address upline, uint8 bondType) external payable {
.................................
    uint256 refReward = distributeRefPayout(user, msg.value, isNewUser);
    uint256 adminFee = msg.value / 10;
    (bool success, ) = payable(DEFAULT_TREASURY).call{value: adminFee}("");
    require(success, "Failed to send PLS");

    newBond(msg.sender, bondType, msg.value, msg.value - adminFee - refReward);
}

function stake(uint8 bondIdx) external payable {
.................................
    uint256 refReward = distributeRefPayout(user, msg.value, false);
    uint256 adminFee = msg.value / 10;
    (bool success, ) = payable(DEFAULT_TREASURY).call{value: adminFee}("");
    require(success, "Failed to send PLS");
.................................
}

function distributeRefPayout(
    Models.User storage user,
    uint256 ethAmount,
    bool isNewUser
) private returns (uint256 refReward) {

    if (user.upline == address(0)) {
      return 0;
    }

    uint256 amount = ethAmount * REFERRAL_PERCENT / Constants.PERCENTS_DIVIDER;
    if (amount > 0) {
      payable(user.upline).transfer(amount);
      users[user.upline].totalRefReward+= amount;
      refReward+= amount;

      emit Events.RefPayout(
        msg.sender, user.upline, amount, block.timestamp
      );
    }
.................
}
```

Informational

When users set address they buy with for referral or address(0) or address that is not participating in the project yet (address with 0 bonds), the user becomes referral to default address assigned by project's owner.
Referral reward is 5% from user's deposited value.

```
function buy(address upline, uint8 bondType) external payable whenNotPaused {
  ......................
    bool isNewUser = false;
    Models.User storage user = users[msg.sender];
    if (user.upline == address(0)) {
      isNewUser = true;
      if (upline == address(0) || upline == msg.sender || users[upline].bondsNumber == 0) {
        upline = DEFAULT_UPLINE;
      }
      user.upline = upline;

      if (upline != DEFAULT_UPLINE) {
        users[upline].referrals.push(msg.sender);
      }

      emit Events.NewUser(
        msg.sender, upline, block.timestamp
      );
    }
.......................
}
```

Informational

Owner can change PRICE_BALANCER_PERCENT's value.
This variable is responsible for the current sell ratio price.

```
function changePriceBalancerPercent(uint256 percent) external onlyOwner {
    require(percent >= 0 && percent <= 2500, "Invalid percent amount (0 - 2500: 0% - 25%)");
    PRICE_BALANCER_PERCENT = percent;
}

function sell(uint256 tokensAmount) external {
   ..........................
    (uint256 ethReserved, ) = getTokenLiquidity();
    uint256 liquidity = ERC20(LP_TOKEN_ADDRESS).totalSupply()
      * ethAmount
      * (Constants.PERCENTS_DIVIDER + PRICE_BALANCER_PERCENT)
      / Constants.PERCENTS_DIVIDER
      / ethReserved;

    ERC20(LP_TOKEN_ADDRESS).approve(
      PULSEX_SWAP_ROUTER_ADDRESS,
      liquidity
    );

    (, uint256 amountETH) = IPulseXRouter01(PULSEX_SWAP_ROUTER_ADDRESS).removeLiquidityETH(
      TOKEN_ADDRESS,
      liquidity,
      0,
      0,
      address(this),
      block.timestamp + 5 minutes
    );

    path[0] = Constants.WRAPPED_ETH;
    path[1] = TOKEN_ADDRESS;
    amounts = IPulseXRouter01(PULSEX_SWAP_ROUTER_ADDRESS).swapExactETHForTokens {value: amountETH} (
      0,
      path,
      address(this),
      block.timestamp + 5 minutes
    );

    emit Events.Sell(
      msg.sender, tokensAmount, ethAmount, block.timestamp
    );
}
```

RECOMMENDATIONS FOR

GOOD PRACTICES

1. Consider fundamental tradeoffs
2. Be attentive to blockchain properties
3. Ensure careful rollouts
4. Keep contracts simple
5. Stay up to date and track development

SAM

GOOD PRACTICES FOUND

- ✔ The owner cannot set a transaction limit

CONTRACT 2 INFO (Token)

Token Name
SAM

Symbol
SAM

Contract Address
0xA31F437A92440d0017ae0109307ae67706E8e0e6

Network
Pulsechain **TESTNET**

Language
Solidity

Deployment Date
Nov 21, 2023

Contract Type
Yes

Total Supply
1,000,000,000

Status
Not launched

TAXES

Buy Tax
N/A

Sell Tax
N/A

Our Contract Review Process

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Blockchain security tools used:

- OpenZeppelin
- Mythril
- Solidity Compiler
- Hardhat

Informational

Owner can enable/disable token buys.

```
function unlockBuy() external onlyOwner {
  buyLocked = false;
}

function lockBuy() external onlyOwner {
  buyLocked = true;
}

function _beforeTokenTransfer(address from, address to, uint256 ) internal view override {
  if (LP_TOKEN_ADDRESS == address(0) || !buyLocked) {
    return;
  }

  if (from == LP_TOKEN_ADDRESS || from == PULSEX_SWAP_ROUTER_ADDRESS) {
    require(
        to == mainContractAddress
      || to == PULSEX_SWAP_ROUTER_ADDRESS
      || to == LP_TOKEN_ADDRESS
      || to == address(0),
      "Transfer: only main contract can buy tokens"
    );
  }
}
```

RECOMMENDATIONS FOR

GOOD PRACTICES

1. Consider fundamental tradeoffs
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SAM

GOOD PRACTICES FOUND

- ✔ The owner cannot set a transaction limit

This is *ROI staking dapp with referral system that allows users to get up to 5% from each referral. When users choose to stake their capital (bonds/liquidity) they can earn up to 150% of their initial investment over time.

More information can be found in the project's documents page:
https://samprotocol.gitbook.io/doc/overview/sam-bond

ROI dapps are considered as high risk and can cause significant losses of capital.
***DYOR before investing in any.**

ROI - **Return **O**f **I**nvestment*
DYOR - **Do **Y**our **O**wn **R**esearch*

TOKENOMICS

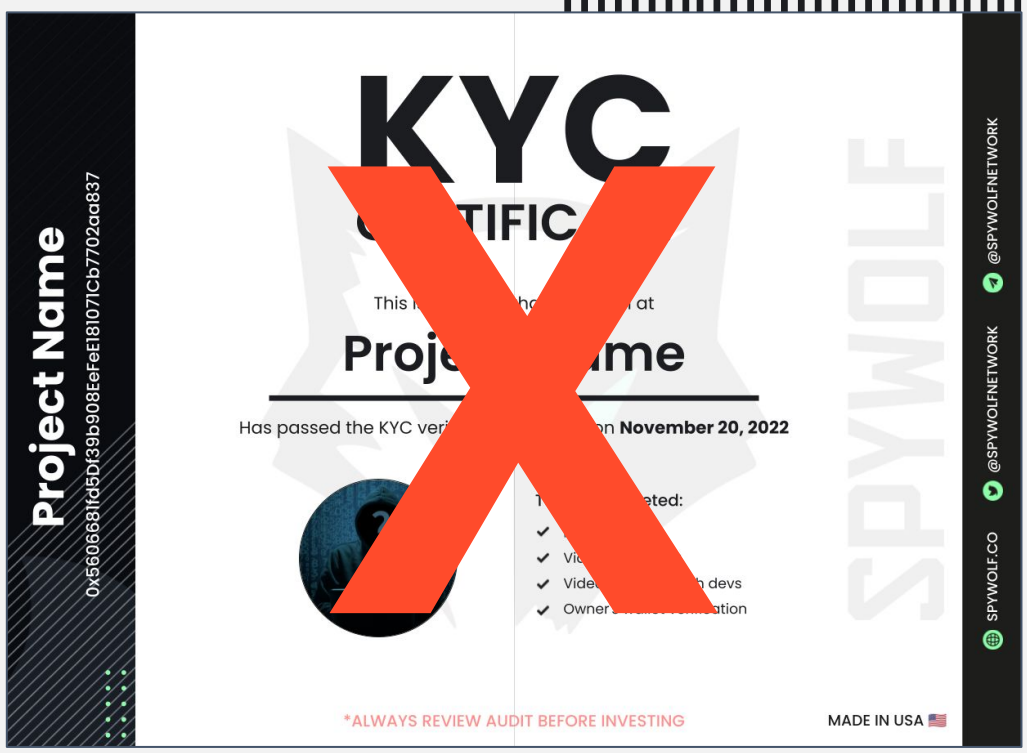
THE TEAM

⚠️ The team is annonymous

KYC INFORMATION

No KYC

We recommend the team to get a KYC in order to ensure trust and transparency within the community.



WEBSITE

Website URL
https://samuel.finance/

Domain Registry
https://www.hostinger.com

Domain Expiration
2024-11-14

Technical SEO Test
Passed

Security Test
Passed. SSL certificate present

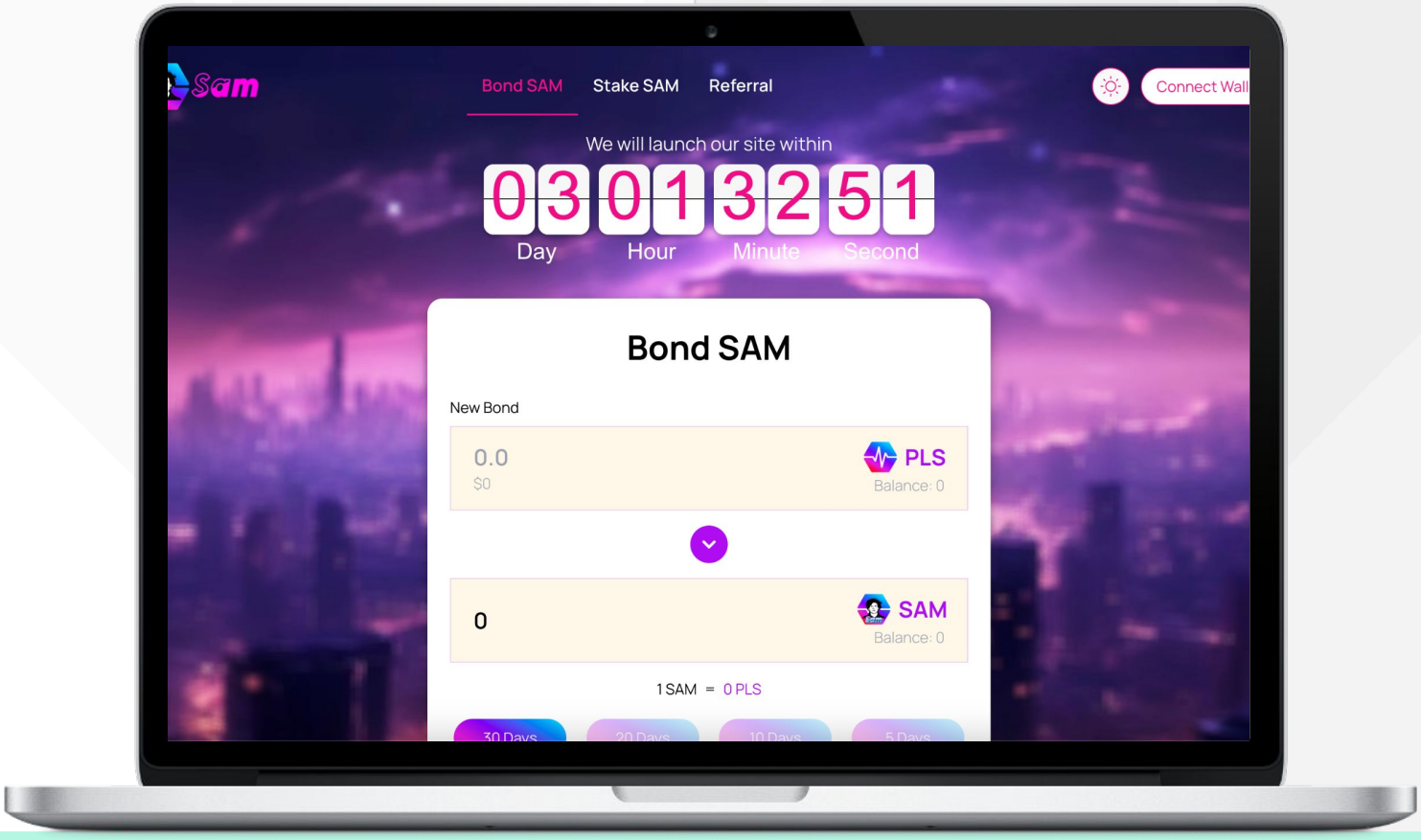
Design
Very nice overall design with appropriate color scheme and graphics.

Content
The information helps new investors understand what the product does right away. No grammar mistakes found
.

Whitepaper
Well written and explanatory documents page.

Roadmap
No

Mobile-friendly?
Yes



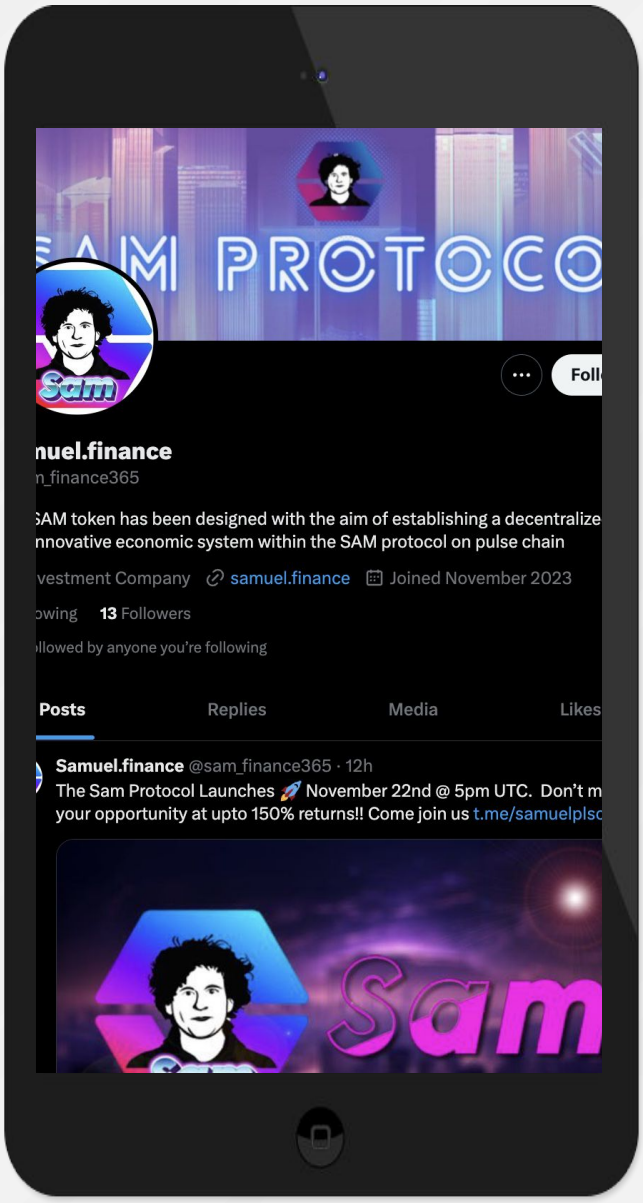
samuel.finance

SOCIAL MEDIA

& ONLINE PRESENCE

ANALYSIS

Project's social media pages are active.



Twitter

@carol_protocol

- 13 followers
- 2 total posts
- New account

Discord

- Not available

Telegram

@samuelplsofficial

- 81 members
- Active members
- Active mods

Medium

- Not available

ABOUT US

We are a growing crypto security agency offering audits, KYCs and consulting services for some of the top names in the crypto industry.

- **OVER 700 SUCCESSFUL CLIENTS**
- **MORE THAN 1000 SCAMS EXPOSED**
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Disclaimer

This report shows findings based on our limited project analysis, following good industry practice from the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, overall social media and website presence and team transparency details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report.
While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the disclaimer below – please make sure to read it in full.

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No applications were reviewed for security. No product code has been reviewed.